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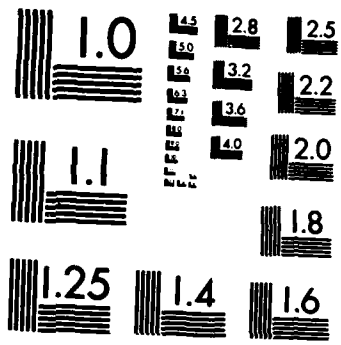

MEDICAL INFORMATION SYSTEMS: FAMILIARITY AND RECEPTIVITY

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MEDICAL INFORMATION SYSTEMS: FAMILIARITY AND RECEPTIVITY*

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Summary

Problem

The administrative burden associated with Navy reporting requirements is great. The need for a shipboard medical information system to ease this burden has been documented. However, a recent study to assess medical information system needs indicated that some respondents did not feel the medical department should be computerized.

Objective

The objective of this study was to determine if a relationship existed between perceived automation need and current automation status. It was hypothesized that those less familiar with the benefits to be attained through automation would be less receptive to medical department computerization.

Approach

One hundred and six surface ships of the Pacific Fleet were surveyed to determine current level of medical department automation and perceived need for computerization. Measures of current automation were the presence of the Shipboard Non-tactical ADP Program (SNAP) and/or microcomputers. Measures of receptivity to department automation included perceived need for automation of reports and composite scores of perceived need for twelve automated medical capabilities.

Results

At each higher automation level there was greater receptiveness to automating reports. The correlation between automated reports requested and current automation status was significant. The composite medical functions need scores also increased with present level of automation.

Conclusions

Those ships with the highest present levels of automation were the most receptive to medical department computerization. The hypothesized relationship between automation familiarity and receptivity was supported. Any pre-implementation strategy should include a thorough user orientation with the system and its associated benefits.

Medical Information Systems: Familiarity and Receptivity

Christopher G. Blood
Dawn M. P. Brand

Introduction

The responsibilities of Navy shipboard medical department representatives are many and varied. In addition to direct patient care, medical department personnel perform tasks such as preventive medicine training for the crew, medical supply inventory, monitoring of sanitation, and the writing of numerous reports. The average workweek of independent duty corpsmen is 59 hours in port and 85 hours at sea[1]. Administrative duties were found to take up the largest percentage of the working day of medical department personnel.

In view of the administrative burden placed upon corpsmen aboard U.S. Navy ships, it would seem logical that automating administrative functions would be readily perceived as a work saving measure. Indeed, the need for a shipboard medical information system has been documented[2] and general requirements for such a system have been outlined[3]. However, in a survey to assess medical information needs, the data obtained showed that some respondents did not feel the medical department should be computerized[4]. This lack of receptiveness may bear on the post-implementation utilization of any such system. Previous investigations have shown that attitudes towards computers prior to implementation affect both short and long-term adaptation to computerization[5] and reactions to training[6]. Research has also shown that as people are exposed to computers and their associated benefits, anxiety decreases and a positive attitude toward computers develops[7,8].

The purpose of this study, then, was to examine perceived need as a possible function of a departmental condition that varied among ships. It was hypothesized that medical personnel aboard ships with some current automation capability would exhibit greater receptivity toward computerization of medical department functions than those aboard ships that presently have no departmental automation. This hypothesis is based on the expectation that medical department representatives with some current automation on board will be more familiar with the benefits attained through automation than personnel aboard vessels with no computerization.

Materials and Methods

The shipboard medical information system needs survey was mailed to 173 ships of the Surface Pacific (SURFPAC) and Air Pacific (AIRPAC) Fleets. Responses were received from 106 ships, representing 14 types of surface vessels: ammunition, amphibious, battleship, carrier, cruiser, destroyer, frigate, landing, minesweeper, oiler, repair, salvage, store, and support. Table 1 indicates the information surveyed concerning automation status and need. Measures of current automation were the presence or absence of computers. A number of Navy ships have implemented an automated system called the Shipboard Non-Tactical ADP Program (SNAP) for generating reports, tracking medical tickler file information, and maintaining supply inventories. In addition, some medical departments have acquired microcomputers to perform a similar variety of medical functions as well as tasks such as word processing. Accordingly, information on the presence of the SNAP system or other microprocessors aboard ship yields four levels of current automation status: 1) no micros or SNAP; 2) SNAP only; 3) micros only; and 4) micros and SNAP. The presence of microcomputers alone was considered a higher level of automation than SNAP alone because of accessibility and flexibility. Microcomputers, when present, were always located in the medical department (not always true with SNAP) and the programs run on the micros were limited only by the skills of the user whereas SNAP has preset formats.

The measures of automation receptivity were the number of reports perceived as needing computerization and the extent to which the 12 proposed medical functions were perceived as being needed. Receptiveness to automation of the 12 medical functions was computed as follows: a composite perceived need score summed over the 12 capabilities with two points assigned for great need, one point for some need, and zero points for no need/doesn't apply. Additionally, a percent need score was calculated without considering the degree of need (the sum of one point for each needed function divided by twelve). Number of medical personnel and weekly patient load were also looked at in reference to perceived need.

Results

The internal consistency of the perceived need measures was assessed by correlating the number of reports needing automation with the composite medical functions need score. This analysis indicated that these measures were

Table 1

Queries from Automation Status and Perceived Need Survey

- Is the SNAP (Shipboard Non-tactical ADP Program) computer system aboard this ship?
- Are there presently any microcomputers used by members of the medical department?
- Which reports would you most like to see automated?
- Using this scale (G=great need for automation, S=some need for automation, N=no need for automation, D=doesn't apply to this ship), check the following areas for need of being automated.

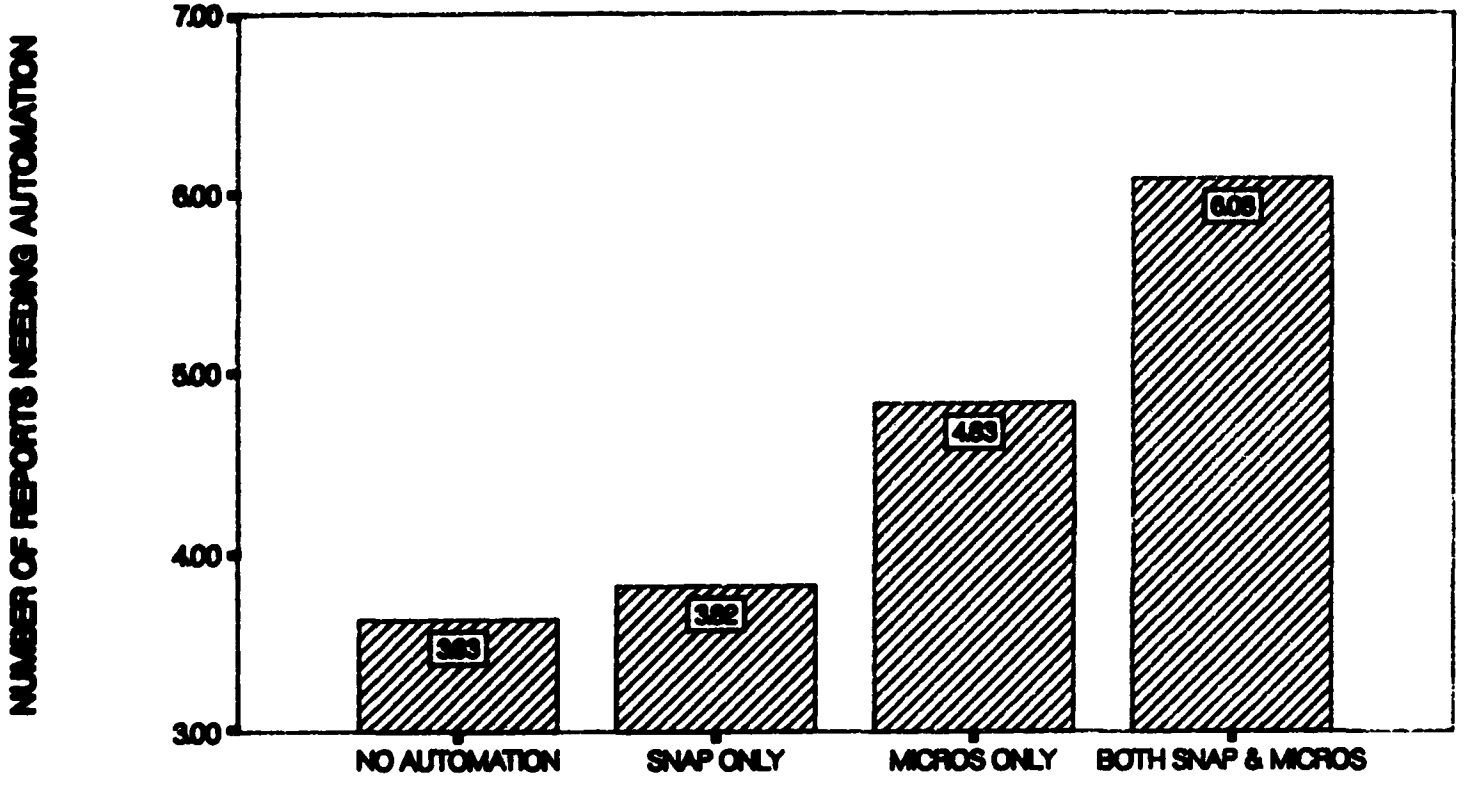
G	S	N	D	
				PATIENT RECORDS
				MEDICAL SUPPLY INVENTORY
				GENERATING REPORTS/LOGS
				COMPILING FORM LETTERS/MESSAGES
				MEDICAL DECISION MAKING
				PERIODIC TRAINING FOR MEDICAL DEPARTMENT STAFF
				GENERAL MEDICAL TRAINING FOR CREW
				PREVENTATIVE MEDICAL TRAINING FOR CREW
				MEDICAL REFERENCE LIBRARY
				DAILY TASK INVENTORY
				PHARMACY SUPPORT
				QUALITY ASSURANCE FUNCTIONS

- List the rank of each medical department member.
- What is the average weekly patient load?

significantly correlated ($r=.254$, $p<.05$). Another analysis was conducted to evaluate the interdependence of the categories of current automation status. The result of a chi square analysis was not statistically significant indicating that the presence of microcomputers aboard ship was not related to the presence of SNAP.

Examining the mean number of reports perceived as needing automation by the four levels of automation status, it was found that means ranged from 3.63 to 6.08. Figure 1 shows that at each higher automation level there was a greater receptiveness to automating reports. Further, this trend was found to

FIGURE 1. MEAN NUMBER OF REPORTS INDICATED AS NEEDING AUTOMATION BY CURRENT MEDICAL DEPARTMENT COMPUTERIZATION STATUS



be significant when a correlation was computed between number of automated reports requested and automation status ($r=.206$, $p<.05$).

Among all survey respondents, the composite medical functions need score ranged from 0.00 to 24.00 with a mean of 16.72. This index of automation receptivity increased with present level of automation as shown in Figure 2. Though the difference did not reach statistical significance, the mean percent need score of ships without automation was 87%, as compared with 94% for those ships with both SNAP and microcomputers.

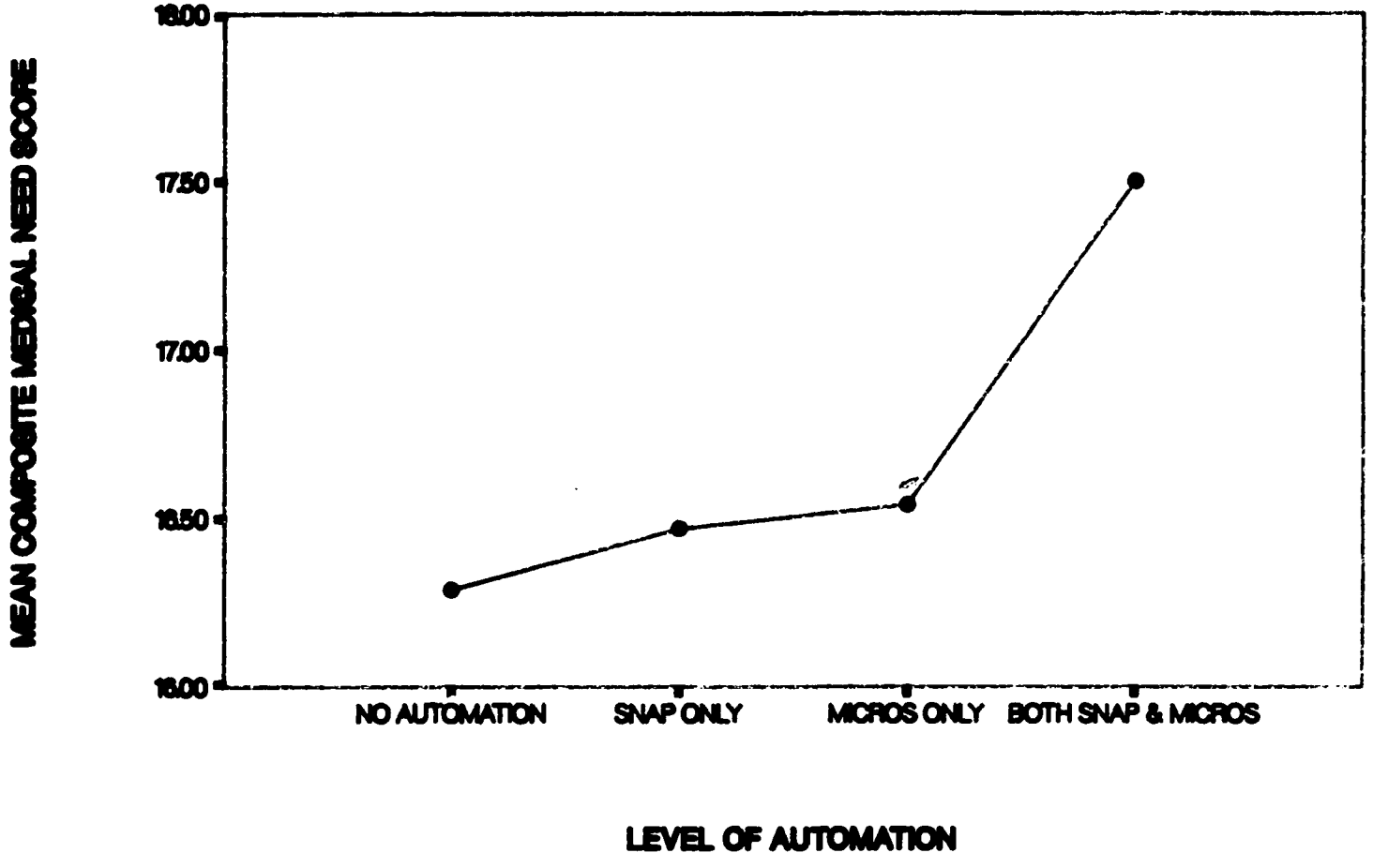
The relationship between measures of medical department size and perceived automation need was also investigated. Number of medical personnel aboard ships ranged from one to forty, while weekly patient load varied from ten to five hundred. The correlation coefficients for number of medical personnel and weekly patient load with number of automated reports requested were .088 and -0.094 respectively. When the two indicators of medical department size were correlated with the composite medical need score, coefficients of .053 and .042 were obtained. The lack of significance of these four correlations suggests that the size of the medical department was unrelated to perceived automation need.

Discussion

The present study sought to determine if those shipboard medical department representatives using computers and, therefore, familiar with the potential benefits to be achieved through automation, would be more receptive to further automation than would medical personnel aboard ships lacking automation. Receptivity to medical department computerization was indeed highest among representatives of ships that currently had the highest levels of automation.

There was a progressive increase in the ratings of perceived automation need through the four levels of current department computerization: no current automation, presently have access to SNAP system, presently use microcomputer for medical department functions, and presently have SNAP and microcomputer. This was true for the two most sensitive indicators of receptivity--number of reports perceived as needing automation and a composite score of need for 12 different medical department functions. Additionally,

FIGURE 2. MEAN COMPOSITE MEDICAL FUNCTION NEED SCORE BY LEVEL OF CURRENT MEDICAL DEPARTMENT AUTOMATION



when the 12 capabilities were looked at in terms of overall percent need, those representatives aboard ships with microcomputers and SNAP clearly perceived their need to be greater than those on ships with no automation. These significant results and observed trends cannot be attributed to larger departments needing more automation because both patient load and number of medical personnel yielded nonsignificant correlations with the measures of perceived automation need.

Ships without automation and, therefore, less familiar with the benefits attainable through automation (that is, savings in time and greater record accuracy), were the least receptive to computerization of medical functions. Previous investigations support the notion of an inverse relationship between computer familiarity and automation resistance[8] and also document the potential costs in terms of manhours, dollar amounts, and quality of care to which resistance to medical unit computerization can lead[9]. The observed relationship between automation familiarity and receptivity further underscores the need for a thorough orientation and training program prior to medical information system implementation.

References

1. Nice, D.S., Hilton, T.F. Job Characteristics of Shipboard Independent Duty Hospital Corpsmen. Report No. 86-20, Naval Health Research Center, San Diego, 1986.

2. Naval Health Research Center Shipboard Independent Duty Corpsmen Study, Briefing Report, November 1985.

3. Helmkamp, J.C., Gunderson, E.K.E., Parsons, W.M. Functional Concepts for a Shipboard Medical Information System, Report No. 84-48, Naval Health Research Center, San Diego, 1984.

4. Blood, C.G., Peeps-Brand, D.M., Pugh, W.M., Helmkamp, J.C. Shipboard Medical Information System Needs Among Surface Ships. Report No. 87-18, Naval Health Research Center, 1987.

5. Counte, M.A., Kjerulff, K.H., Salloway, J.C., Campbell, B.C., Adapting to the Implementation of a Medical Information System: A Comparison of Short- versus Long-Term Findings. *Journal of* Medical Systems, Vol. 11, No. 1, 11-20, 1987.

6. Kjerulff, K.H., Counte, M.A., Salloway, J.C., Campbell, B.C., Noskin, D.E., Medical Information System Training: An Analysis of the Reactions of Hospital Employees. Computers and Biomedical Research, 17:303-310, 1984.

7. Sizemore, M.H., Pontious, S., CAI Promotes Nursing Student Mastery of Health History Taking. Journal of Computer-Based Instruction, Vol. 14, No. 2, 62-67, 1987.

8. Madsen, J.M., Sebastiani, L.A., The Effect of Computer Literacy Instruction on Teachers' Knowledge of and Attitudes Toward Microcomputers. Journal of Computer-Based Instruction, Vol. 14, No. 2, 68-72, 1987.

9. Dowling, A.F., Jr., Do Hospital Staffs Interfere with Computer System Implementation? Health Care Management Review, 5:23-32, 1980.

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Analyses were performed on the perceived automation needs and current medical department computerization status aboard ships of the U.S. Pacific Fleet to determine if present automation status had a bearing on receptivity to further automation. Current medical department automation status consisted of microcomputers and/or the Shipboard Non-tactical ADP Program (SNAP). Measures of receptivity to department automation included perceived need for automation of reports and composite scores of perceived need for twelve automated medical capabilities. Those ships with the highest present levels of automation were the most receptive to medical department computerization. Lack of familiarity with benefits to be attained through automation was proposed as responsible for observed decrements in receptivity among medical departments.

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